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09/674,415	02/05/2001	Evgeny Invievich Givargizov	GIVAR5.001 A	8472

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EXAMINER

NEGRON, ISMAEL

ART UNIT	PAPER NUMBER
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2875

DATE MAILED: 06/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/674,415

Applicant(s)

GIVARGIZOV ET AL.

Examiner

Ismael Negron

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2003 and 05 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 51-88 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 67-76 and 78-80 is/are allowed.
- 6) ☒ Claim(s) 51-66 and 82-88 is/are rejected.
- 7) ☒ Claim(s) 77 and 81 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 February 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendments filed on April 7 and May 5, 2003 has been entered. Claims 51, 54, 57, 61, 66-69, 78, 80-82 and 86-88 have been amended. No claims have been added or cancelled. Claims 51-88 are still pending in this application, with claims 51, 67, 69, 78 and 82 being independent.

### *Drawings*

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "01" has been used to designate different parts in different embodiments. See Figures 3a where "01" is used to designate a top of a field emitter having substantially curved sides, and 4a-4e (where the same reference characters are used to designate a top of field emitter having substantially linear sides. As clearly evident by the cited figures, at least two different field emitters (curve sides and linear sides) are disclosed and referenced by the same characters. In addition, it is noted that Figure 4c shows yet another version of the linear-side field emitter having a substantially block-like base (designated by character "b"). Correction is required.

In addition, note the following:

- reference character "02" in Figures 6a and 6b;
- reference character "03" in Figures 3a, 3b, 4b, 5a, 5b and 6a;
- reference character "04" in Figures 3a, 4a-4e, 5a-5d, 6a, 6b and 7;
- reference character "06" in Figures 3a and 4a.

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The applicant is advised that the reference characters must be properly applied, with no single reference character being used for two different parts or for a given part and a modification/variation of such part. See MPEP §608.01(g). Correction is required.

### ***Specification***

3. The disclosure is objected to because of the following informalities: it fails to adequately describe the claimed invention in such a manner as to enable any person skilled in the pertinent art or science to make and use the claimed invention without involving extensive and undue experimentation. Appropriate correction is required.

The applicant is strongly advised to review MPEP § 608.1(g).

4. In addition, the complete disclosure should be revised to assure that it complies with the format required by 37 C.F.R. 1.77, as discussed in the previous Office Action (Paper No. 9, Section 10).

### ***Claim Rejections - 35 USC § 112***

#### ***First Paragraph***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 82-88 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to

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reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to disclose how the different steps of forming the claimed invention are actually reduced to practice. It is noted that the body of the specification does not support the claims, since it does not include a detailed description of the claimed method, but a general statement of intention.

### *Second Paragraph*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 59, 60, 77 and 81 are indefinite as it is not clear what the applicant intended to cover with the use of the phrase "*diamond-like material*". The interpretation of the cited phrase is made more difficult since the specification is silent as to what characteristic of such "*diamond-like material*" are critical to the claimed invention. Claim 67 is indefinite as it is not clear how are the different elements of the claimed invention related to one another.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 51-53, 55, 56, 58 and 61-66 are rejected under 35 U.S.C. 102(b) as being anticipated by Borel et al. (U.S. Pat. 4,940,916).

Borel et al. discloses an electron source having :

- **a substrate**, Figure 4, reference number 5;
- **a field emitter**, Figure 4, reference number 12;
- **the body of the field emitter being a cone epitaxial to the substrate**, column 1, lines 46-49;
- **a source of charge carriers supplying the field emitter**, Figure 4, reference number 20;
- **at least one ballast resistor**, Figure 4, reference number 24;
- **the ballast resistor being configured as a barrier between different materials located near, or in the field emitter**, column 6, lines 19-37;
- **the substrate includes an insulating layer**, Figure 4, reference number 4;
- **the substrate also including a conductive layer**, Figure 4, reference number 22;

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- **at least one barrier formed within the conductive layer, Figure 4;**
- **the barrier being formed at least in part by an insulating layer that is perpendicular to the charge carrier flow, Figure 4;**
- **the field emitter including at least one semi-conductor material, inherent;**
- **an end of the field emitter having a narrow tip, Figure 4;**
- **the field emitter having two coaxial parts, one narrow outer part and a broad inner part, Figure 4;**
- **an insulating layer at least part way in between the conducting layer and the surface of the field emitter, Figure 4; and**
- **the source of charge carriers being the conducting layer, Figure 4.**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 54, 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Borel et al. (U.S. Pat. 4,940,916).

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Borel et al. discloses an electron source having :

- **a substrate**, Figure 4, reference number 5;
- **a field emitter**, Figure 4, reference number 12;
- **the body of the field emitter being a cone epitaxial to the substrate**, column 1, lines 46-49;
- **a source of charge carriers supplying the field emitter**, Figure 4, reference number 20;
- **at least one ballast resistor**, Figure 4, reference number 24;
- **the ballast resistor being configured as a barrier between different materials located near, or in the field emitter**, column 6, lines 19-37; and
- **an end of the field emitter having a narrow tip**, Figure 4.

Borel et al. discloses all the limitations of the claims, except the substrate being a mono-crystalline substrate with 111 orientation, or the tip of the emitter being sharpened and diamond coated.

It would have been an obvious matter of design choice to use a mono-crystalline substrate with (111) orientation, since the applicant has not disclosed that such feature solves any problem or is for a particular reason. It appears that the claimed invention would perform equally well with the field emitter structure as disclosed by Borel et al..

In addition, the Examiner takes Official Notice that the use of diamond coated field emitters is old and well known in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use diamond coated field



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emitters in the system of Borel et al.. One would have been motivated since diamond coated field emitters are recognized in the illumination art to have superior electrical and mechanical characteristics, such as high carrier mobility, wide band gap, high thermal conductivity, mechanical hardness and multi-spectral transparency.

***Allowable Subject Matter***

9. Claims 67-76 and 78-80 are allowed

10. Claims 77 and 81 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

Applicant teaches an electron source having a substrate with an epitaxially grown field emitter extending from its surface. The field emitter includes a side surface with an insulating layer covering at least a portion of such surface with a diamond material, or at least one ballast resistor formed by a junction between materials with opposite conductivities.

No prior art was found teaching individually, or suggesting in combination, all of the features of the applicants' invention, specifically the epitaxially grown field emitter with an at least partially covered side surface with a diamond material, or at least one ballast resistor formed by a junction between materials with opposite conductivities.

***Response to Arguments***

12. Applicant's arguments filed April 7 and May 5, 2003 have been fully considered but they are not persuasive.

13. Regarding the Examiner's rejection of claims 59, 60, 77 and 81 under 35 U.S.C. 112, 2<sup>nd</sup> Paragraph, the applicant argues that the phrase "diamond-like" is definable as "having properties that are similar to diamond" and that it is widely used. The applicant provides as proof of such definitiveness a copy of a symposium titled "Diamond-like Semiconductors".

In response to applicant's arguments regarding "diamond-like" being a definite limitation the applicant is advised that addition of the word "type" to an otherwise definite expression extends the scope of the expression so as to render it indefinite, since it is unclear what "type" is intended to convey. *Ex parte Copenhaver*, 109 USPQ 118 (Bd. App. 1955). See MPEP § 2173.05(b)(E).

14. Regarding the Examiner's rejection of claim 51 under 35 U.S.C. 102(b), the applicant argues that the cited reference fails to disclose all the features of the claimed invention, specifically the field emitter being epitaxially grown.

In response to applicant's arguments regarding the field emitter of Borel et al. not being epitaxially grown, the applicant is advised that patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *In re Thorpe*, 777 F.2d 695,

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698, 227 USPQ 964, 966. In this case, Borel et al. discloses a "whisker-like" field emitter for a display panel. In light of applicant's failure to further describe the structural differences between the prior art field emitter and that of the claimed invention, Borel et al. was considered to broadly meet the claim limitations.

15. With respect to claims 52-66 the applicant presents no arguments, except stating that such claims are dependent upon claim 51 and would be allowable if the independent claim 51 is allowed.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

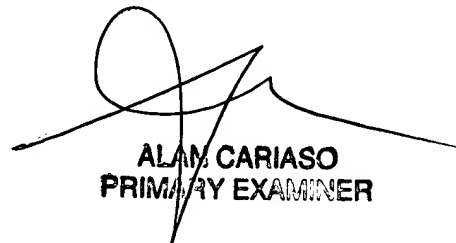
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ismael Negron whose telephone number is (703) 308-

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6086. The examiner can normally be reached on Monday-Friday from 9:00 A.M. to 6:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra L. O'Shea, can be reached on (703) 305-4939. The facsimile machine number for the Art Group is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.



ALAN CARIASO  
PRIMARY EXAMINER

Inr

June 8, 2003